

10CFR50.73

April 22, 2011

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Limerick Generating Station, Unit 2
Facility Operating License No. NPF-85
NRC Docket No. 50-353

Subject: LER 2011-002-00, Manual Actuation of the Reactor
Protection System Due To Stator Cooling Water High
Temperature Actuation

This Licensee Event Report (LER) addresses an event that resulted in a manual actuation of the reactor protection system following an automatic trip of both reactor recirculation pumps. The pumps tripped due to a main generator stator cooling water high temperature actuation which also resulted in an automatic main turbine electro-hydraulic control load set runback.

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

There are no commitments contained in this letter.

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

Original signed by

William F. Maguire
Vice President - Limerick Generating Station
Exelon Generation Company, LLC

cc: USNRC Administrator Region I
USNRC Senior Resident Inspector, LGS

LICENSEE EVENT REPORT (LER)(See reverse for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

Limerick Generating Station, Unit 2

2. DOCKET NUMBER

05000353

3. PAGE

1 OF 4

4. TITLE

Manual Actuation of the Reactor Protection System Due To Stator Cooling Water High Temperature Actuation

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	25	2011	2011	- 002 -	00	04	22	2011		05000
9. OPERATING MODE 1			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
			<input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.46(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(i)(A) <input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(i)(C) <input type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(iii) <input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 50.73(a)(2)(ix)(A) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 73.71(a)(5) <input type="checkbox"/> OTHER Specify in Abstract below or in NRC Form 366A				
10. POWER LEVEL 100										

12. LICENSEE CONTACT FOR THIS LER

NAME

John G. Hunter III, Manager – Regulatory Assurance

TELEPHONE NUMBER (Include Area Code)

610-718-3400

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
D	TJ	TSH	M235	Y					

14. SUPPLEMENTAL REPORT EXPECTED☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE)☒ NO**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

A manual actuation of the reactor protection system was initiated following an automatic trip of both reactor recirculation pumps. The pumps tripped due to a main generator stator cooling water high temperature actuation which also resulted in an automatic main turbine electro-hydraulic control load set runback. The root cause of the event was a failure to properly control a degraded stator cooling water temperature control valve that required manual operator action in lieu of an automatic control function. The automatic temperature control valve was repaired. The "Adverse Condition Monitoring and Contingency Planning" and "Operational and Technical Decision Making Process" procedures will be revised regarding actions required to substitute a manual operator action for an automatic control function.

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NARRATIVE

Unit Conditions Prior to the Event

Unit 2 was in Operational Condition (OPCON) 1 (Power Operation) at approximately 100% power in end-of-cycle operation with all control rods withdrawn. The stator cooling water (SCW) system (EIIS:TJ) temperature was being controlled manually due to a degraded automatic temperature control valve (EIIS:TCV).

Description of the Event

On Friday, February 25, 2011, Limerick Unit 2 was operating at 100% power. At 0910 hours, a main generator stator coolant trouble alarm was received and a main turbine electro-hydraulic control (EHC) load set runback actuated. This was followed by a trip of the 2A and 2B Reactor Recirculation Pumps (EIIS:AD) as designed. The operators manually initiated the reactor protection system (RPS) (EIIS:JC) as directed by the "Recirculation Pump Trip" procedure (OT-112). The operators also entered the "Loss of Stator Water Cooling Runback" procedure (ON-114) and verified the expected automatic actions had occurred. All control rods inserted and all safety significant systems functioned as expected.

The operating crew stabilized the plant using the appropriate Transient Response and Operating Procedures. The highest transient reactor level observed on the plant monitoring system (PMS) was plus 45 inches following the trip of the reactor recirculation pumps and the lowest level observed was plus 3.5 inches due to the post-scrum void contraction. The digital feed water level control system (DFWLC) responded as designed. There were no emergency core cooling system (ECCS) actuations or challenges. The only automatic isolation actuated was the expected plus 12.5 inch isolation signal for Group IIB. All main turbine supervisory functions and main generator protective relaying functioned as designed.

An investigation determined that SCW high temperature actuation was due to a degraded SCW temperature control valve that required manual control as well as three SCW high temperature switches (EIIS:TS) that were improperly calibrated during the previous refueling outage.

A 4-hour NRC ENS notification was required by 10CFR50.72(b)(2)(iv)(B) for an actuation of RPS when the reactor was critical. An 8-hour NRC ENS notification was required by 10CFR50.72(b)(3)(iv)(A) for a valid actuation of RPS. The ENS notification (#46641) was completed on Friday, February 25, 2011 at 1148 ET. This event involved a manual actuation of RPS. Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

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Analysis of the Event

There were no actual safety consequences associated with this event. The potential safety consequences of this event were minimal. A loss of both reactor recirculation pumps transient is categorized as an incident of moderate frequency per the Updated Final Safety Analysis Report (UFSAR) section 15.3.1 Recirculation Pump Trip, subsection 15.3.1.1.2.2. The plant equipment performed as designed during the transient. The operators effectively stabilized reactor parameters.

The SCW system is equipped with three stator water outlet temperature switches with trip setpoints of 81 degrees Centigrade. The switches are arranged in 2 out of 3 trip logic. When the trip logic is actuated the system actuates a main turbine EHC load set runback and trips both reactor recirculation pumps following time delays of 9 seconds for 2A reactor recirculation pump and 18 seconds for 2B reactor recirculation pump. The reactor recirculation pump trips are bypassed when feedwater flow is less than 44 percent.

The SCW high temperature actuation was due to the following conditions that reduced the margin to the actuation:

- 1) improper calibration of the SCW high temperature switches resulted in low setpoints
- 2) the computer point used to monitor SCW outlet temperature indicated lower than actual conditions
- 3) the temperature band established for use during manual control was exceeded
- 4) the Mercoid high temperature switches have a large dead band from trip to reset
- 5) the Mercoid high temperature switch setpoints are susceptible to early actuation due to vibration

Cause of the Event

The root cause of the event was a failure to properly control a degraded SCW temperature control valve that required manual operator action in lieu of an automatic control function.

Corrective Action Completed

The Unit 1 and Unit 2 SCW outlet temperature switches were re-calibrated.

The Unit 2 SCW temperature control valve was repaired and placed in automatic control.

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Corrective Action Planned

The Adverse Condition Monitoring and Contingency Planning (ACMP) procedure (OP-AA-108-111) and Operational and Technical Decision Making Process (OTDM) procedure (OP-AA-106-101-1006) will be revised to add a requirement to initiate an OTDM for any ACMP that substitutes a manual operator action for an automatic control function.

Previous Similar Occurrences

There was one similar event in the last 3 years. Unit 1 LER 2010-001 reported a manual scram following an automatic trip of both reactor recirculation pumps. The event was caused by a 13 kV cable failure. The 1B reactor recirculation pump tripped on a SCW runback.

Component data:

Equipment: Generator Stator Winding Cooling Water
Discharge
Component Number: TSH-M2-2T72A(B,C)
Manufacturer: M235 Mercoïd Corp
Model Number: DA-38-103-6